2.	Frustules with a terminal crest	*minutum.*
	Frustules not crested	3
3.	Forms large masses; frustules large without terminal puncta	*geminatum.*
	Very minute; frustules minute with two conspicuous terminal puncta	*pohliæforme.*
4.	Frustules with a terminal crest	*cristatum.*
	Frustules not crested	5
5.	Frustules curved	*minutissimum.*
	Frustules not curved	6
6.	Marine; lateral surfaces not striated, front with striæ extending from the terminal puncta	*paradoxum.*
	Fresh water; lateral surfaces striated, front surfaces without longitudinal striæ	7
7.	Front view nearly linear; lateral surfaces lanceolate	*dichotomum.*
	Front view broadly cuneate; lateral surfaces obovate or clavate	*Berkeleii.*

PROCEEDINGS OF LEARNED SOCIETIES.

GEOLOGICAL SOCIETY.

Feb. 22, 1843.—A paper was read "On some new species of Fossil Chimæroid Fishes, with remarks on their general affinities," by Sir Philip Grey Egerton, M.P., F.G.S.

The number of described species of Chimæra—soft-boned fishes of singular forms—is very small, whether existing or extinct. They were first recognised in a fossil state by Dr. Buckland in 1835. The original memoir comprised descriptions of four species; two others were added by Professor Agassiz. The list was soon afterwards augmented by two species from the Stonesfield slate, constructed by Dr. Buckland from some enigmatical specimens forwarded by the author under the impression that they had some resemblance to the subjects he was engaged upon. A ninth species came from the Caen oolite. A tenth has been described by Professor Owen in his 'Odontography' from specimens in the Hunterian collection, and Professor Agassiz has named an eleventh in the museum of Lord Enniskillen, from the gault. Sir P. Egerton, in the present memoir, doubles the number. With one exception he founds his characters on the lower jaws of the animals, avoiding the risk of ascribing specific differences to teeth derived from one and the same species, varying in form according to their position in the mouth.

The characters of the new species are as follows:—

1. *C. neglecta.*—Maxillary plate, left lower jaw: length 6 lines; depth at the symphysis 2 lines; ditto at the medial angle of the dental edge 3 lines; length of the dental edge $3\frac{1}{4}$ lines; anterior division of ditto $1\frac{1}{2}$ line; posterior ditto ditto $1\frac{3}{4}$ line; length of the heel $2\frac{1}{2}$ lines; exterior convex; exposed surface slightly furrowed; base expanded and vertically striated; two depressions, the anterior one broad, the posterior narrow and deep. Stratum, great oolite: locality, Stonesfield.

2. *C. Bucklandi.*—Maxillary plate, right lower jaw (imperfect): length 2 inches 1 line; depth at the symphysis 1 inch 2 lines; ditto at the medial angle of the dental edge 9 lines; length of the dental edge 1 inch 6 lines; anterior division of ditto 1 inch; posterior ditto mutilated; exterior smooth and flat; inner surface rounded, diminishing in diameter towards the base; symphysis oblique and rounded; texture dense. Stratum, great oolite: locality, Stonesfield.

3. *C. psittacina.*—Maxillary plate, right lower jaw: length 8 lines; depth at the symphysis 4 lines; ditto at the medial angle of the dental edge 4 lines; length of dental edge 4 lines; anterior division of ditto $1\frac{3}{4}$ line; posterior ditto $2\frac{1}{4}$ lines; heel $3\frac{1}{2}$ lines; exterior flat, marked by horizontal undulating bands on the base, with a few vertical striæ near the heel; two depressions, broad and shallow; anterior outline abruptly curved upwards to the point. Stratum, great oolite: locality, Stonesfield.

4. *C. curvidens.*—Maxillary plate, right lower jaw: length 1 inch; depth at the symphysis 4 lines; ditto at the medial angle of the dental edge 5 lines; dental edge 7 lines; anterior division of ditto 3 lines; posterior ditto ditto 4 lines; heel 3 lines; exterior convex, curving rapidly inwards to the symphysis; exposed portion invested with a thick lustrous enamelloid coating, 3 lines in depth at the symphysis; base expanded and closely striated; one elongated depression near the heel; anterior division of the dental edge concave, posterior ditto straight. Stratum, great oolite: locality, Stonesfield.

5. *C. falcata.*—Maxillary plate, left lower jaw: length 1 inch; depth at the symphysis $3\frac{1}{2}$ lines; ditto at the medial parts of the dental edge 4 lines; heel 4 lines; dental edge 6 lines; tooth elongated, falcate, the point curved upwards; base shallow anteriorly, expanded and traversed by a broad depression near the heel; vertical striæ indistinct; horizontal bands broad and undulate; cutting edge concave, forming a single curve without any medial angle from the point to the heel. Stratum, great oolite: locality, Stonesfield.

6. *C. emarginata.*—Maxillary plate, left lower jaw: length 2 inches 5 lines; depth at the symphysis 1 inch 8 lines; ditto at the medial angle of the dental edge 1 inch 1 line; dental edge 1 inch 7 lines; anterior division 1 inch; posterior division 7 lines; heel (mutilated) 7 lines; exterior flat, marked by fine vertical striæ; depression at the heel circular, deep and broad; dental edge deeply indented in the form of two semicircles; symphysis straight. Stratum, great oolite: locality, Stonesfield.

7. *C. rugulosa.*—Maxillary plate, left lower jaw: length 1 inch; depth at the symphysis 4 lines; ditto at the medial angle of the dental edge 3 lines; dental edge $6\frac{1}{2}$ lines; anterior division 3 lines; posterior ditto $3\frac{1}{2}$ lines; heel $3\frac{1}{2}$ lines; exterior rugose; one strong depression near the heel striated vertically; anterior division of the dental edge concave; posterior ditto ditto nearly straight. Inner surface: triturating tubercles placed very obliquely. Stratum, great oolite: locality, Stonesfield.

8. *C. helvetica.*—Maxillary plate, right lower jaw: length 2 inches

5 lines; depth at the symphysis 1 inch 4 lines; anterior division of the dental edge 1 inch 4 lines; breadth of ditto 8 lines. This specimen being much mutilated, the measurements are incomplete. It approaches more nearly to *C. Mantelli* than to any other species. Stratum, molasse: locality, Œtmaringen, canton of Argovie.

9. *C. Dutetrii.*—Maxillary plate, left lower jaw: length 4 inches; depth at the symphysis 2 inches 2 lines; breadth of ditto 7 lines; depth at the medial angle of the dental edge 2 inches 2 lines; dental edge 3 inches 6 lines; anterior division of ditto 1 inch 8 lines; width of ditto 8 lines; posterior division of ditto 1 inch 8 lines. This tooth is broad and strong; the exterior is marked with indistinct undulations; the depression at the heel is nearly horizontal. Inner surface: symphysis rather oblique; the triturating tubercles broad, and worn down less obliquely than in *C. Townsendi*, to which species this most nearly approximates. Stratum, Kimmeridge clay: locality, Boulogne.

10. *C. Beaumonti.*—Maxillary plate, right upper jaw: length of the outer margin 3 inches 5 lines; length of the inner ditto 2 inches 8 lines; breadth at the base 1 inch 6 lines; depth of the symphysis 5 lines; breadth of the principal tubercle 6 lines; the upper surface is marked by a deep sulcus, 7 lines in width, running parallel with the symphysis; the inner surface has four triturating prominences, one anterior, two basal, and one intermediate. Stratum, Kimmeridge clay: locality, Boulogne.

11. *C. Dufrenoyi.*—Maxillary plate, left lower jaw: length 2 inches 4 lines; depth at the symphysis 1 inch 1 line; ditto at the medial angle of the dental edge 1 inch 4 lines; dental edge 1 inch 5 lines; anterior division of ditto 7 lines; breadth of ditto 5 lines; posterior division of ditto 8 lines; heel 1 inch; exterior slightly concave and uneven; inner surface contracts rapidly in diameter in the direction of the base; anterior tubercle 1 inch 6 lines in length by 6 lines in breadth, placed very obliquely; posterior tubercle small and narrow. Stratum, Kimmeridge: locality, Boulogne.

The author then enters into a detailed comparison of the fossil Chimæroids with the recent genera *Chimæra* and *Callorhynchus*, and after pointing out the discrepancies both of form and structure which they present, suggests the propriety of withdrawing them from the genus *Chimæra*, under which they have hitherto been arranged. The remainder of the memoir is devoted to a comparison of the fossil species with each other, and the author concludes by proposing to class them under three genera, as shown in the following tabular arrangement.

(1.) *Ischyodus* (ἰσχὺς robur, ὀδοὺς dens).

Two intermaxillary and two maxillary plates in the upper jaw; two maxillary plates in the lower jaw; intermaxillaries thick and strong, truncated more or less obliquely at their extremities. Structure: horizontal laminæ inclosed by parietes of coarse fibrous dentine.

Upper maxillaries: triangular plates articulating with each other and the intermaxillaries on the medial line of the palate; upper surface provided with a deep sulcus parallel to the symphysis for attachment to the jaw; under surface with four triturating prominences,

one in advance, one on the outer margin, and two side by side near the base, the larger one occupying the inner position; structure of the tubercles coarse and tubular; the remainder of the teeth fibrous and bony. Lower maxillaries: large and broad, formed for crushing rather than cutting; two tubercles, one at the heel, the other in advance; symphysis broad; the base invested by the membrane of the mouth, the crown by a coat of hard enamelloid dental substance; structure of the anterior angle as in the intermaxillaries, of the remainder as in the upper maxillaries; position of the plates more or less oblique.

SPECIES.	STRATUM.	LOCALITY.
ISCHYODUS, *Egerton.*		
Agassizi, *Buckl.*	Chalk-marl	Hamsey.
Beaumonti, *Egert.*	Kimmeridge clay	Boulogne.
brevirostris, *Agass.*	Gault	Folkstone.
Bucklandi, *Egert.*	Great oolite	Stonesfield.
Colii, *Buckl.*	ditto	Ibid.
curvidens, *Egert.*	ditto	Ibid.
Dutetrii, *Egert.*	Kimmeridge clay	Boulogne.
Duvernoyi, *Egert.*	ditto	Ibid.
Egertoni, *Buckl.*	ditto	Shotover.
emarginatus, *Egert.*	Great oolite	Stonesfield.
falcatus, *Egert.*	ditto	Ibid.
helveticus, *Egert.*	Molasse	Argovie.
Mantelli, *Buckl.*	Chalk	Lewes.
neglectus, *Egert*	Great oolite	Stonesfield.
Oweni, *Buckl.*	ditto	Ibid.
psittacinus, *Egert.*	ditto	Ibid.
rugulosus, *Egert.*	ditto	Ibid.
Tessoni, *Buckl.*	Oolite	Caen.
Townshendi, *Buckl.*	Portland	Milton.
Sedgwicki, *Agass.*	Greensand	Cambridge.

(2.) *Elasmodus* (ἔλασμα lamina, ὀδοὺς dens).

Two maxillary and two intermaxillary plates in the upper jaw?

Two maxillary plates in the lower jaw; lower maxillary thick and strong; tubercle single, composed of a dental substance resembling in structure a tritor of Psammodus; in advance of the tubercle the tooth is composed of several series of laminæ, arranged in juxtaposition and inclined downwards and outwards; behind the tubercle the dental edge is notched, in consequence of a columnar structure pervading this region of the tooth. The outer surface is enveloped by a coat of dentine.

SPECIES.	STRATUM.	LOCALITY.
ELASMODUS, *Egerton.*		
1. Greenovi*, *Egert.*		
2. Hunteri†, *Egert.*	London clay.	

* Chimæra Greenovii, *Agassiz.* † Chimæra Hunteri, *Owen.*

A single specimen in the Hunterian collection affords the type of a third genus.

(3.) *Psaliodus* (ψαλὶς forfex, and ὀδοὺς dens).

Upper jaw? Two maxillary plates in the lower jaw. Lower maxillary like *Chimæra*, but without a triturating tubercle; structure homogeneous; outer surface reticulated. Sp. *Psaliodus compressus*, Egerton. It is supposed to be from the London clay.

A paper was read "On the Locomotive and Non-locomotive powers of the Family Crinoidea." By J. C. Pearce, Esq., F.G.S.

The author is induced, from an examination of the various modes of attachment among the Crinoidea, to separate those animals into two great groups, the *Non-locomotive* and the *Locomotive*. The former, when once attached to any solid substance by their base or foot, were immoveably fixed; the latter possessed the power of grasping with the foot any substance, and again relaxing their hold at pleasure. The non-locomotive Crinoidea he subdivides into *solid-footed* and *root-footed*. In the solid-footed the foot is formed like an irregular cone with the base downwards, and is composed of successive laminæ, which envelope the inferior part of the column and increase in number as the animal advances in age. This base or foot is generally found firmly adhering to the rock in the fossil state, although specimens are sometimes found detached which appears to have been caused by violence during life. The columns of all the species which Mr. Pearce has examined are very short and destitute of side-arms. He enumerates *Encrinites moniliformis* from the Muschelkalk, *Apiocrinites rotundus* from the Bradford clay, and *Cyathocrinites tuberculatus* from the Dudley limestone, as examples of this group. In the non-locomotive root-footed Crinoids the base is composed of many root-like branches, radiating in a more or less horizontal or downward direction from the lower part of the column, each branch bifurcating several times in an irregular manner. The branches are perforated by a central foramen, and appear to be composed in individuals of all ages, of a solid calcareous substance incapable of motion.

Mr. Pearce divides his locomotive Crinoidea into two sections, *Branch-footed* and *Sucker-footed*. The branch-footed are characterised by the organ of attachment, or foot, being composed of a number of jointed branches, in some species simple, in others bifurcating, or dividing in an irregular manner, and generally terminating in a minute blunt point. Each joint has a central foramen, and is articulated by alternate radiating ridges and grooves, admitting of the greatest degree of flexibility, forming an organ which the author regards as well adapted to crawl along the bottom of the ocean, or to steady the animal against the motion of the water. The columns of this group are generally furnished with side-arms, extending to a greater or less distance from the foot, and sometimes the whole length of the column. Examples are, *Apiocrinites ellipticus* from the chalk, *Pentacrinus Briareus* from the lias, *Actinocrinites tessellatus*, *Platycrinites gigas*, and several undetermined species from the moun-

tain limestone; also *Cyathocrinites goniodactylus*, and several undetermined species from the Dudley limestone.

The sucker-footed locomotive Crinoids have the column destitute of side-arms, and terminating at its inferior extremity in a blunt point. Mr. Pearce subdivides them into *Crinoideform* and *Comatuliform*.

The following table exhibits Mr. Pearce's views of the classification of the family Crinoidea.

Fam.	Group.	Division.	Subdivision.	Genus.	Species.
Crinoidea.	Non-locomotive	Solid-footed ...	.....	Apiocrinites	rotundus.
				Encrinites	moniliformis.
				Cyathocrinites	tuberculatus.
				Eugeniacrinites	nutans.
				———	quinqueangularis.
		Root-footed.....	.....	Cyathocrinites	rugosus.
	locomotive	Branch-footed...	.....	Apiocrinites	ellipticus.
				Pentacrinus	Briareus, jun.
				Actinocrinites	tessellatus.
				Platycrinites	gigas.
				Cyathocrinites	goniodactylus.
		Sucker-footed	Crinoideform	Actinocrinites	moniliformis.
			Comatuliform.	Apiocrinites	fusiformis.

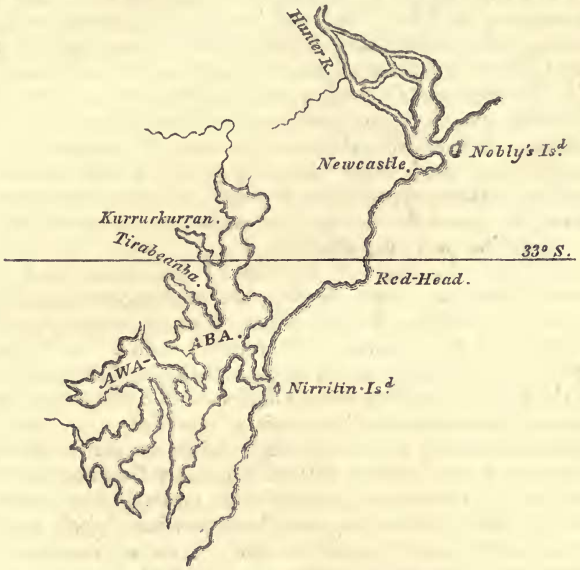
"On an entirely new form of Encrinite from the Dudley Limestone." By J. Chaning Pearce, Esq., F.G.S.

The fossils described in this communication were discovered by Mr. John Gray of Dudley. Mr. Pearce regards them as constituting a new genus which he proposes to name *Pseudocrinites*, including two species both having "the arms and fingers inserted in bands, which commence just above the column and pass over the plates of the head to its summit." The one form has two, the other four ranges of "fingers." They resemble each other in having "the columns at their superior part composed of rings, gradually increasing in size towards the head. The plates of the head are thin and broad, and marked on their outer surface by lines of growth, and radiating ridges resembling the plates of the marsupite. They are also furnished with four orifices of a lozenge shape, most singularly inserted in the plates of the head, and their arms and fingers are exceedingly short. The fingers are composed of two rows of bones, each bone on the one side being inserted between two of the opposite. These fingers appear to be placed in four rows on each of the hands, and pass off from the head in a radiating direction, commencing at the column and uniting at the summit." Mr. Pearce names the first species *Pseudocrinites bifasciatus*, and the second *P. quadrifasciatus*.

"On a Fossil Pine-forest at Kurrur-kurrân, in the inlet of Awaaba, on the eastern coast of Australia," by the Rev. W. B. Clarke, A.M., F.G.S.

Awaaba is one of those inlets which occur at frequent intervals along the eastern coast of New South Wales, and which, from their

sea-entrance being usually narrow and blocked up with drifted sand, are by the colonists termed "*Lakes.*" Awaaba is called Lake Macquarrie, and is the largest of the inlets of that description between Port Stephen and Broken Bay. Its sea-entrance lies fourteen miles to the south of the mouth of the Hunter river, nearly in 33° south latitude.



This inlet occupies a portion of that formation of conglomerate and sandstone, with subordinate beds of lignite, which extends from the Hunter river southwards towards Brisbane Water. The lignite constitutes the so-called Australian coal. This formation, owing to its beds along the shores of the inlet being placed horizontally, and being divided by nearly vertical joints, gives rise to regular lines of coast, both in a longitudinal and transverse direction. It forms along the coast a high range, which, except at the entrance, divides the lake from the sea. Within the lake a series of extensive bays, bounded to the water's edge by steep cliffs, run out like fingers, far up into the country. The water of the inlet is for the most part very deep.

On the western side of the lake, and nearly opposite its sea-entrance, a promontory, bounded on either side by a bay, is formed by the Tirabeenba mountain, which stretches from the S.E. to the N.W., and in the latter direction ends abruptly in a lofty but not very precipitous escarpment: this sudden termination is occasioned by a fault. This mountain range then turns to the W., and afterwards to the S.W.; between it and the next range a wide valley intervenes.

The north-eastern flank of the north-western extremity of this range swells out into a hill of low elevation, from the base of which to the water's edge a low flat extends; the flat is about fifty yards broad, and is, in point of level, within a foot of the surface of the water; it continues along the base of the slope for the space of about half a mile: it is called by the aborigines Kurrur-kurrân. To the south and west of this flat the slopes of the mountain come down to the margin of the lake. The surface of the flat is composed of black sandy vegetable mould, and of detritus thickly interspersed with the roots of plants and grasses; trees of large growth, which are principally Eucalypti and Casuarinæ, together with some others of smaller dimensions, stand at intervals upon it, and grow even close to the water. Beneath the alluvial matter the rock occurs *in situ*: this is a sandstone, which is for the most part of a compact and semi-crystalline texture, approaching to chert; its strata run out to some distance, at a small depth below the surface of the water, and render the lake in that part very shallow.

Throughout the whole of the alluvial flat, stumps and stools of fossilized trees are seen standing out of the ground, and one can form no better notion of their aspect, than by imagining what the appearance of the existing living forest would be if the trees were all cut down to a certain level. In the lake also, where it adjoins the flat, to the distance of from 80 to 200 feet from the shore, numerous points are seen, like those of a reef of rocks, just peeping above the surface of the water; these points are the fossilized stools and stumps of tree, similar to those which are found on shore. The greater part of these stems, both of those on land and in water, stand vertically; many of those on shore have remains of their roots in the sandstone rock beneath the alluvial matter; and of those which stand in the water, one at the distance of three feet from the shore has portions of its roots imbedded in the sandstone on which it rests. The rock immediately round the roots is not of so harsh a texture as it is in other parts; in it, in the neighbourhood of the roots which are in the water, there appear numerous white spots, which give the stone a mottled appearance: this arises from a multitude of small cavities which contain powdery silex, similar to what is often found in the cavities of chalk-flints. On the shore, the surface of the rock near the stems is worn into a number of little holes, which are owing to the decay and removal of this powder. Mr. Clarke sees no other explanation of these specks, than that they mark the situation of the fibres which proceeded from the roots. The roots of the trees are in some instances surrounded by an accumulation of sandy rock, which forms a mound of a higher level than the rest of the stratum. The roots do not descend, so far as has been ascertained, very far into the substance of the rock, nor is there any appearance of a dirt-bed. The stools stand from two to three feet above the surface of the ground, and vary from two to four feet in diameter; but one in the lake is at least four feet above the level of the water, and five or six feet in diameter. In several of the stumps from 60 to 120 concentric rings of growth may be counted: a few of the stools are hollow

in the centre, but others are solid throughout: the wood appears to be coniferous. Veins of chalcedony traverse the substance of the trunks between the concentric rings, and also in the direction of the radial lines.

Many of the stems at Kurrur-kurrân have the bark adhering firmly to the trunk, and the bark in one instance was of the thickness of three inches. Its appearance in one or two cases was such as to show that it had been partly torn from the tree while yet standing, as if it had been broken down and the bark had been rent by the fall.

The colour of the substance of the stems within varies from a greyish white to a clouded grey, but their surfaces, when exposed to the air, have become yellowish by weathering; many are overgrown by lichens, and have then exactly the appearance of the stumps of recent trees. The upper extremities of the fossil stumps present clean horizontal sections, which shows that they were not broken off while recent, since no mode of fracturing recent pinewood could have occasioned such neat, plain and parallel sections as the summits of these stumps exhibit.

In a fragment of the sandstone from the base of one of the fossil stumps, the silicified impression of part of the leaf of a Glossopteris was found.

Immediately below the flinty stratum in which the trees are found is a bed of lignite; above the level at which the trees occur, there are found, imbedded in the sandstones and conglomerates, immense quantities of broken fragments of trees, apparently stripped of their boughs and branches. These fragments are generally divested of their bark, and appear to have been drifted.

Fossil trees are found in this formation at other places, and nearly at the same level above the sea as at Kurrur-kurrân; they occur in sandstone similar to that of Kurrur-kurrân, at the southern extremity of the Tirabeenba mountain, immediately above and below a bed of lignite. At the spot referred to, pits have very recently been opened for working the lignite, at the level of about four feet above the surface of the lake. At the south head of Reid's Mistake, which is the name for the sea-entrance to the inlet of Awaaba, similar beds of sandstone occur, and these are traversed vertically by the trunks of trees, while other trees lie horizontally in the same beds. Lines of division, which appear to be owing to the contraction of the whole mass, intersect both the trees and their matrix: these trees are found at a somewhat higher level than the sea. At nearly the same level in Nirritinbali (or Mutton-bird Island), off the entrance to Awaaba, large stools and stems of trees occur in conglomerate, which conglomerate reposes on beds of lignite. Fossil trees are also found in conglomerate reposing on lignite on the coast north of the entrance to Awaaba, at Redhead, at Newcastle, and at Nobby's Island, off the mouth of the Hunter river. At Nobby's Island the trees lie in a pebbly grit, passing into conglomerate, and are mineralized by hydrate of iron; they are from 10 to 150 feet long. At none of the above places, however, do the trees occur in such profusion as at Kurrur-kurrân.

Fragments of roots and of the boughs of trees, divested of their bark, are found at Munniwarrée, Wollogong and Mulibinbak, imbedded in beds of sandstone at a higher level than the beds which contain the fossil trees. Similar fragments are found spread over the surface at Wollon Hill, at Holworthy Down, and elsewhere in the colony; it is probable therefore that the bed of sandstone containing trees in a vertical position, which is found nearly at the same level above the sea at Kurrur-kurrân and the other places above-mentioned, is the true geological position of that ancient forest from which the enormous quantities of the fragments of wood which occur either spread over the surface, or imbedded in the sandstone above and below the lignite, have been derived.

The sandstones of this formation, and in this vicinity, have been powerfully affected by the action of intrusive rocks; they are traversed, at Nobby's Island and on the coast near Newcastle, by trap dykes. The author refers to the 'Voyage' of Flinders, page 131, for an account of mineralized fossil wood found in Bass's Straits, at Reservation Island, which is composed of granite and of schist, traversed by granite veins and trap dykes. He also refers to the 'Tasmanian Journal,' vol. i. p. 27, for an account, by the surgeon of H.M.S. Erebus, Dr. M'Cormick, of silicified wood found in association with trap rocks in Kerguelen's Land; and to the same volume, p. 24, for an account by Dr. T. D. Hooker, assistant-surgeon to H.M.S. Erebus, of fossil wood found at Macquarrie plains, in Tasmania.

The author infers, from the present position of the fossil trees at Kurrur-kurrân, that the land must have been alternately depressed and elevated. He makes mention in the course of his paper of two beds of lignite, one above the bed of fossil trees and one below it; but he does not describe the relative position and distance of these two beds.

March 22.—A paper was read "On some Pleistocene Deposits near Copford, Essex," by John Brown, Esq.

The order of the component beds of these deposits was taken from a cutting made for the Eastern Counties Railway. The lowest bed noticed consists of blue clay, which the author refers to a great detritic accumulation called "till," and which occurs extensively over the northern portion of the county of Essex. The till varies considerably in character and composition; at the N. extremity of the section which the author exhibited, it was described as consisting of a stiff tenacious clay, but within a short space it changed to a sandy gravel, containing fishes' teeth and corals in great abundance: the rock fragments have been derived from basaltic and secondary beds; the latter afforded the fossils contained in the following list, for the identification of which the author states that he has been indebted to Mr. J. de C. Sowerby. *Serpula illium*, L.; *S. tetragona*, L.; *S. articulata*, G. S.; *S. granulata*, C.; *Terebratula rigida*, U. Ch.; *T. pisum*, Ch. M.; *T. striatula*, L. Ch.; *Gryphæa incurva*, L.; *G. dilatata*, K. C.; *Inoceramus*, C.; *Avicula inæquivalvis*, L.; *Exogyra virgula*, K. C.; *Crania striata*, C.; *Pollicipes maximus*, C.; *Ammonites Leachii*, K. C.; *A. annulatus*, L.; *A. dentatus*, G.; *A.*

spinosus, K. C.; *A. serratus*, O. C.; *Belemnites acutus*, L.; *B. pistilliformis*, L.; *Littorina carinata*, G. S.; *Pentacrinites basaltiformis*, L.; *Encrinites moniliformis*, O. The remains of fishes were, *Otodus appendiculatus*, C.; *Galeus pristodontus*, C.; *Notidanus pristis*, C.; *Odontaspis rhaphiodon*, C.; *Hybodus*, U. O., which were determined for the author by Mr. S. P. Woodward.

The Pleistocene deposit at the Copford brick-field consists, in an ascending order, of a bed of black vegetable matter, or peat, from six inches to one foot in thickness, resting immediately upon the "till:" from this stratum the following shells were procured, which were named for the author by Mr. S. P. Woodward:—*Vertigo palustris*; *V. edentula*; *V. pusilla*; *V. pygmea*; *V. substriata*; *Azeca tridens*; *Acme fusca*; *Carychium minimum*; *Zua lubrica*; *Clausilia rolphii*; *Cl. nigricans*; *Cl. bidens*; *Succinea pfeifferi*; *S. putris*; *Aplexus hypnorum*; *Limnius palustris*; *L. truncatulus*; *Planorbis spirorbis*; *P. vortex*; *Pisidium pusillum*; *Helix nemoralis*; *H. hortensis*; *H. arbustorum*; *H. lapicida*; *H. rufescens*; *H. hispida*; *H. pulchella*; *H. lamellata*; *H. spinulosa*; *H. fulva*; *Zonites rotundatus*; *Z. ruderata*; *Z. cellarius*; *Z. radiatulus*; *Z. nitidulus*; *Z. luridus*; *Z. crystallinus*; *Pupa anglica*; *P. umbilicata*; *P. marginata*.

Above the peat is a bed of clay and detritus about one foot thick, containing many of the land and freshwater shells cited above; next above this is a second layer of peat with shells.

At the southern extremity of the author's section, the order of the beds was as follows:—1. Diluvial clay, 3 feet. 2. White sand with shells, 3 feet. 3. White calcareous marl with shells, together with the bones of the elephant, ox and deer. 4. Peat with shells (*Valvata piscinalis*), 6 inches. 5. Blue clay with freshwater shells.

The author suggests that this deposit is the bed of an ancient pond, which occupied a depression on the surface of the till.

ZOOLOGICAL SOCIETY.

Feb. 14, 1843.—William Yarrell, Esq., Vice-President, in the Chair.

Mr. Gould exhibited and characterized the following two new species of Birds, from the collection formed by Capt. Sir Edward Belcher, R.N., during the voyage of Her Majesty's Ship 'Sulphur.'

PTEROGLOSSUS ERYTHROPYGIUS. *Pt. vertice, facie, mento, et dorso superiore nitidè virescenti-nigris; alis caudâque sordidè fuscescenti-viridibus; dorso inferiore, uropygio, et caudæ tectricibus splendidè sanguineis; corpore inferiore flavo, pectore superiore sanguineo tincto, inferiore vittâ coloribus nigro et sanguineo commixtis, fasciato.*

Crown of the head, sides of the face, chin, and upper part of the back shining greenish black; wings and tail dull brownish green; lower part of the back, rump, and upper tail-coverts shining blood-red; under surface yellow, stained on the chest with blood-red, and crossed on the breast by a band of mingled black and blood-red; bill bordered at the base by a narrow line of dull white; the remainder of the bill yellowish horn colour, with a broad stripe of black along

the upper mandible near the cutting edge, and the tip of the under mandible black; feet greenish black.

Total length, 18 inches; bill, 5; wing, $6\frac{1}{4}$; tail, $7\frac{1}{2}$; tarsi, $1\frac{1}{4}$.

Pterocles personatus. *Pt. plumis a basi rostri, usque ad oculos, intensè nigris; capitis reliquis partibus, collo, et pectore arenaceo-cervinis, non sine tincturâ vinosâ ad basim colli; dorso vinoso-fusco; caudæ tectricibus pallidè fuscis, notis irregularibus cervinis per plumas in lineis obliquis ordinatis, crebrè guttatis.*

Fœmina facie nigrâ caret.

Male.—Feathers surrounding the base of the bill, as far as the eyes, deep velvety black; remainder of the head, as well as the neck and chest, sandy buff, tinged with vinous at the base of the neck, both above and below; back vinous brown; wings sandy buff, the coverts tipped with dark brown, which colour forms three semicircular fasciæ across the wing; primaries and secondaries dark brown, the latter marked irregularly with sandy buff on the basal half of their outer margins; rump and upper tail-coverts light brown, with numerous irregular marks of buff, arranged in oblique lines down the length of the feathers; tail-feathers deep brown, crossed on their outer webs with decided, and on the inner with irregular, bars of buff, all the feathers largely tipped with buffy white, all the under surface crossed with small bars of dark brown, light brown, and buff; under tail-coverts sandy buff.

The female differs in not having the black face, in having all the upper as well as the under surface of the body barred, like the latter part in the male; the wings numerously barred with brown, and the under tail-coverts sandy red.

Total length, 13 inches; bill, $\frac{7}{8}$; wing, $8\frac{3}{4}$; tail, 4; tarsi, 1.

Mr. Fraser laid before the Meeting eight new species of Birds from Western Africa, which he thus characterizes:—

Collurio Smithii. *Coll. supernè niger, plumis scapularibus, guttâ apud primarias, secundariarum nonnullarum apicibus sic et corpore subtùs, rectricumque caudæ quatuor externarum apicibus albis; rostro pedibusque nigris.*

Long. tot. 8 poll.; rostri, $\frac{3}{4}$; alæ, $3\frac{1}{4}$; caudæ, $4\frac{1}{2}$; tarsi, $\frac{3}{4}$.

Hab. Cape Coast.

This species is named in honour of Dr. Smith, the author of the 'Illustrations of the Zoology of South Africa.'

Drymoica mentalis. *Drym. suprà fusca, primariis ad marginem pallidioribus, subtùs rufescens, fronte genisque rufo-castaneis, gulâ et lineâ angustâ superciliari albis; lineâ angustâ nigrâ inter gulam albam, genasque castaneas; caudâ?; rostri mandibulâ superiore nigrâ, inferiore corneâ; tarsis flavis.*

Long. tot. ? poll.; rostri, $\frac{3}{4}$; alæ, $2\frac{3}{4}$; caudæ, ?; tarsi, 1.

Hab. Accra.

Drymoica Strangei. *Drym. suprà fusca, strigâ superciliari et corpore subtùs albis; rectricibus caudæ subtùs saturatè cinereis, guttâ nigrâ propè apices, apicibus albis.*

Long. tot. $5\frac{1}{4}$ poll.; rostri, $\frac{3}{4}$; alæ, $4\frac{1}{2}$; caudæ, 2; tarsi, 1.

Hab. Accra.

"I have ventured to name this species after Lieut. J. N. (now Commander) Strange, R.N., to whom I was indebted for kindness and assistance throughout the whole term of the expedition."

DRYMOICA LATERALIS. *Drym. suprà fusca, lateribus cinerascentibus, subtùs alba, femoribus rufis, rectricibus caudæ subtùs saturatè cinereis, guttâ nigrâ propè apices, apicibus albis.*

Long. tot. $5\frac{1}{2}$ poll.; rostri, $\frac{3}{4}$; alæ, $2\frac{1}{2}$; caudæ, 2; tarsi, $\frac{3}{4}$.

Hab. Cape Palmas.

Differt a *Drym. Strangei* corpore suprà saturatiore, lateribus cinereis, caudâ magis gradatâ, cum colore albo apicali magis circumscripto, et obscuriore.

DRYMOICA RUFICAPILLA. *Drym. ♂ vertice rufo, corpore suprà saturatè fusco, corpore toto inferiore et gulâ albis, dimidio femorum inferiore rufo; caudâ ut in* D. laterali, *at magis gradatâ; rostro nigro.*

Long. tot. $6\frac{3}{4}$ poll.; rostri, $\frac{5}{8}$; alæ, $2\frac{1}{2}$; caudæ, $2\frac{1}{2}$; tarsi, $\frac{7}{8}$.

Hab. River Nùn, Western Africa.

This species differs from others of the genus here described in having the white of the under parts extending to the nostrils, a rufous crown to the head, and a black beak. It was shot near the mouth of the above-mentioned river in the month of August.

DRYMOICA RUFA. *Drym. suprà rufa, subtùs sordidè flava, rostro tarsisque flavis.*

Hab. River Quorra, opposite Iddah.

DRYMOICA RUFOGULARIS. *Drym. ♀ suprà fuliginosè fusca, levitèr viridi tincta; gulâ pectoreque rufescentibus; abdomine, tectricibus alarum inferioribus et caudâ utrinque rectricibus tribus externis albis; rostro suprà nigro, subtùs flavo; tarsis carneis, iridibus pallidè rufescenti-fuscis.*

Long. tot. $3\frac{3}{4}$ poll.; rostri, $\frac{1}{2}$; alæ, $1\frac{3}{4}$; caudæ, $1\frac{5}{8}$; tarsi, $\frac{3}{4}$.

Hab. Clarence, Fernando Po.

DRYMOICA UROPYGIALIS. *Drym. suprà fusca, singulis plumis pallidiore marginatis, strigâ superciliari et corpore subtùs albis, lateribus et femoribus levitèr rufo-lavatis, uropygio subrufo; caudâ saturatè fuscâ, fasciâ perpallidè rufâ, alterâ nigrâ, et apice albo, rostro fusco, tarsis flavis.*

Long. tot. 4 poll.; rostri, $\frac{1}{2}$; alæ, 2; caudæ, $1\frac{1}{2}$; tarsi, $\frac{3}{4}$.

Hab. Accra.

A series of Shells were laid before the Meeting, upon which Mr. Hinds observed that they constituted the first portion of a collection which it is proposed, from time to time, to bring under the notice of the Society. The collection was made by Captain Sir Edward Belcher, R.N., C.B., during the late voyage of Her Majesty's Ship 'Sulphur,' aided by the cooperation of Mr. Hinds, the surgeon of the vessel. The following descriptions are by Mr. Hinds:—

TRICHOTROPIS CANCELLATA. *Tri. testâ oblongâ; anfractibus senis, rotundatis, costatis, valdè cancellatis; costis setosis; anfractu ultimo infrà subplanulato; suturâ profundâ; aperturâ rotundatâ, ad basin truncatâ; umbilico parvo lineari, labio inferno ferè occulto.* Axis 8 lin.

Hab. Sitka, North-west America. Dredged in the harbour from a sandy bottom, in from five to seven fathoms, together with *T. inermis*.

Shell oblong, the spire more produced than in *T. bicarinata*; the whorls separated by a deep suture, profoundly cancellated; many-keeled, and furnished on the lines of the striæ of increase with numerous short bristles at regular intervals. The aperture is rounded, and truncated at the base; the canal so short as scarcely to exist. Umbilicus small, and somewhat concealed by the inner lip, which is slightly developed.

Three specimens are in the collection, and one, being a dead shell and deprived of its epidermis, shows very distinctly the deep cancellation of the whorls. A single specimen, and larger by two lines, is in the possession of Mr. Cuming, who obtained it with some shells from the north-west coast of America, the measurement of which I have adopted.

Trichotropis inermis. *Tri. testâ ovatâ, solidulâ; anfractibus quaternis rotundatis, multicostatis, longitudinaliter lævissimè striatis; costulis subæqualibus, planulatis, inermibus; aperturâ oblongâ, canali brevi desinente; umbilico mediocri; labio interno producto.* Axis $7\frac{1}{2}$ lin.

Hab. Sitka, North-west America. In company with the preceding.

In shape and outline this shell approaches *T. borealis*. It will be readily distinguished from any hitherto known species by the absence of armature on the epidermis, in which we lose sight in the instance before us of one of the characters of the genus. The whorls are rounded and separated, as in the other species, by a deep suture. The last whorl is remarkable for the strong ridges which it bears at rather distant intervals, marking the termination or commencement of the periodical stages of growth.

In the method of formation of the canal there is a close affinity in this shell to some *Cancellariæ*, particularly in the angular-mouthed species, and the affinity is extended to the character of the whorls and their connexion by the suture.

Trichotropis flavida. *Tri. testâ oblongâ, tenui; spirâ elatâ; anfractibus septenis tricostatis, ultimo infernè quadricostato; epidermide pallidè corneâ indutâ; aperturâ angulatâ, ad basin obliquè truncatâ; canali brevissimo; umbilico parvo, lineari.* Axis 8 lin.

Hab. ——?

Allied to *T. cancellata*, but is a more delicate and elongated shell; and the epidermis, though having some shreds attached to it, is destitute of the bristled armature. A single specimen is in the collection of Mr. Cuming, without any history.

Typhis quadratus. *Typ. testâ subquadratâ, fuscâ vel albidâ, lineis pallidis transversis; quadrifariam varicosâ; varicibus crassis, acutis, ad spiram commixtis, supernè nodulosis, in spinis appressis desinentibus; tubulis subrectis vel deorsùm inclinatis; canali mediocri laterali.* Axis 11 lin.

Hab. Gulf of Nicoya and the Bay of Guayaquil. Dredged from a muddy bottom in from seven to eighteen fathoms.

Allied to *Typhis Sowerbii*, but distinguished from it by its squarish shape, thick and nodulous varices, closely appressed spines, and the decided lateral direction of the canal.

Typhis arcuatus. *Typ. testâ corneâ, fusiformi; quadrifariam varicosâ; varicibus arcuatis, inermibus, ad spiram benè distinctis, supernè in tubulis desinentibus; tubulis complanatis, ascendentibus; canali mediocri recurvo.* Axis 5½ lin.

Hab. Cape of Good Hope. Dredged on the L'Agulhas Bank in from forty to fifty-four fathoms.

Shell fusiform, of a horn-colour; the varices arcuate, terminating in the tube, and ascending the spire even to the apex, giving it a pyramidal shape. The character of the bowed spineless varices is peculiar, and altogether it is a very distinct species.

Typhis nitens. *Typ. testâ ovali, albidâ, lævigatâ, nitidâ; quadrifariam varicosâ; varicibus acutis in spinis excentricis desinentibus; tubulis rectis; canali brevi recurvo.* Axis 4 lin.

Hab. Straits of Macassar, Indian Archipelago. Dredged from among gravel and coral in eighteen fathoms.

Looking from the apex, the spines and tubes will be seen to be disposed in an elegant spiral manner about the spire. It is the first species, as far as I am acquainted, that has hitherto been found in the Indian seas, and is at the same time the smallest yet recorded.

MISCELLANEOUS.

ON THE MICROSCOPE. MEANS OF REMEDYING THE DEFECT OF ARTIFICIAL LIGHT. BY J. W. GRIFFITH, MD., F.L.S. *

It must have been repeatedly noticed by microscopic observers of any experience, that the only agreeable time for making minute observations is during daylight, and that examinations made at this time only can be relied on. The pure white daylight, furnished by reflection of the sun's rays from large floating cumuli, is that which best illuminates microscopic objects; whilst the orange or reddish-yellow light of a lamp or candle wearies the eye incomparably more than the softness of daylight. There is also a marked glare with candle or lamplight: this is very annoying to most observers; so much so as to compel many to use the microscope by daylight alone, which few can have the opportunity of doing. To remedy this defect of artificial light, by showing the method of rendering it as white as daylight, is the object of the present communication.

The imperfections of lamp or candlelight appear to me to arise mainly from two causes: 1st, its being monochromatic; 2ndly, the colour in excess being that which is most intensely luminous, viz. yellow. The first renders us totally unable to appreciate colour; the second causes a very unpleasant and injurious glare. It occurred to me that these might be overcome from the following considerations.

It is well known, that by the combination of a certain colour form-

* From the Medical Gazette, for Nov. 25, 1843.